

CLAIMS:

1. A semiconductor processing method, comprising:
forming a layer of material over a semiconductive wafer substrate;
exposing some portions of the layer to energy while leaving other
portions unexposed, the exposing altering physical properties of the
exposed portions of material relative to the unexposed portions of
material;

after the exposing, subjecting the exposed and unexposed portions
of the layer to common conditions, the common conditions being
effective to remove the material and comprising a rate of removal that
is influenced by the altered physical properties of the layer, the common
conditions removing either the exposed or unexposed portions faster
than the other of the exposed and unexposed portions; and

after the selective removal of the exposed or unexposed portions,
and while the other of the exposed and unexposed portions remains
over the substrate, cutting the wafer into separated die.

2. The method of claim 1 wherein material comprises silicon.

3. The method of claim 1 wherein the material comprises
carbon, silicon and oxygen.

1 4. The method of claim 1 wherein the material comprises
2 silicon bound to a hydrocarbon group and bound to oxygen.

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4 5. The method of claim 1 wherein the material comprises
5 $(\text{CH}_3)_y\text{Si}(\text{OH})_{4-y}$, with y being greater than 0 and less than 4.

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7 6. The method of claim 1 wherein the material comprises
8 $\text{Si}(\text{OH})_4$.

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10 7. The method of claim 1 wherein the energy is in the form
11 of ultraviolet light.

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13 8. The method of claim 1 wherein the energy is in the form
14 of an electron beam.

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16 9. The method of claim 1 wherein the energy is in the form
17 of a plasma.
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10. A semiconductor processing method, comprising:
forming a layer of a silicon-comprising material over a substrate;
exposing some portions of the layer to energy while leaving other
portions unexposed, the exposing altering physical properties of the
exposed portions relative to the unexposed portions; and
after the exposing, subjecting the exposed and unexposed portions
of the layer to common conditions, the common conditions being
effective to remove the silicon-comprising material and comprising a rate
of removal that is influenced by the altered physical properties of the
layer, the common conditions removing either the exposed or unexposed
portions faster than the other of the exposed and unexposed portions.

13. ~~11.~~ The method of claim ¹²~~10~~ wherein the silicon-comprising
material comprises carbon, silicon and oxygen.

14. ~~12.~~ The method of claim ¹²~~10~~ wherein the silicon-comprising
material comprises silicon bound to a hydrocarbon group and bound to
oxygen.

15. ~~13~~. The method of claim ~~10~~¹² wherein the silicon-comprising material comprises silicon bound to a hydrocarbon group and bound to oxygen, and wherein the hydrocarbon group does not comprise a carbon-containing ring.

16. ~~14~~. The method of claim ~~10~~¹² wherein the silicon-comprising material comprises $(\text{CH}_3)_y\text{Si}(\text{OH})_{4-y}$, with y being greater than 0 and less than 4.

17. ~~15~~. The method of claim ~~10~~¹² wherein the silicon-comprising material comprises $\text{Si}(\text{OH})_4$.

18. ~~16~~. The method of claim ~~10~~¹² wherein the energy is in the form of ultraviolet light.

19. ~~17~~. The method of claim ~~10~~¹² wherein the energy is in the form of an electron beam.

20. ~~18~~. The method of claim ~~10~~¹² wherein the energy is in the form of a plasma.

1 ^{21.} 19. The method of claim ¹² 10 wherein the silicon-comprising
2 material comprises $(CH_3)_ySi(OH)_{4-y}$, with y being greater than 0 and less
3 than 4, and the energy is in the form of ultraviolet light; and wherein:
4 the exposing comprises passing the ultraviolet light through
5 openings in a patterned mask and onto the layer of material to expose
6 said some portions of the layer to the ultraviolet light while leaving said
7 other portions unexposed; and
8 the common conditions comprising subjecting the entire layer to
9 hydrofluoric acid, the hydrofluoric acid removing portions of the layer
10 that were not exposed to ultraviolet light at a faster rate than portions
11 of the layer that were exposed to ultraviolet light.
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3x.

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~~22.~~ 20. The method of claim ~~10~~¹² wherein the silicon-comprising material comprises $\text{Si}(\text{OH})_4$ and the energy is in the form of ultraviolet light; and wherein:

the exposing comprises passing the ultraviolet light through openings in a patterned mask and onto the layer of material to expose said some portions of the layer to the ultraviolet light while leaving said other portions unexposed; and

the common conditions comprising subjecting the entire layer to a solvent comprising hydrofluoric acid, the hydrofluoric acid removing portions of the layer that were not exposed to ultraviolet light at a faster rate than portions of the layer that were exposed to ultraviolet light.

~~23.~~ 21. The method of claim ~~10~~¹² wherein the silicon-comprising material comprises $\text{Si}(\text{OH})_4$ and the energy is in the form of an electron beam; and wherein:

the exposing comprises exposing said some portions of the layer to the electron beam while leaving said other portions unexposed; and

the common conditions comprising subjecting the entire layer to hydrofluoric acid, the hydrofluoric acid removing portions of the layer that were not exposed to the electron beam at a faster rate than portions of the layer that were exposed to the electron beam.

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22. A semiconductor processing method, comprising:
forming a layer of $(\text{CH}_3)_y\text{Si}(\text{OH})_{4-y}$, with y being greater than 0 and less than 4, over a substrate;
exposing some portions of the layer to ultraviolet light while leaving other portions unexposed, the exposing converting the exposed portions to $(\text{CH}_3)_x\text{SiO}_{2-x}$, with x being greater than 0 and less than 2; and
after the exposing, subjecting the exposed and unexposed portions of the layer to hydrofluoric acid to selectively remove the $(\text{CH}_3)_y\text{Si}(\text{OH})_{4-y}$ of the unexposed portions relative to the $(\text{CH}_3)_x\text{SiO}_{2-x}$ of the exposed portions.

25. 23. 24

The method of claim 22 wherein the ultraviolet light is passed onto the layer of $(\text{CH}_3)_y\text{Si}(\text{OH})_{4-y}$ through openings in a patterned mask.

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The method of claim 22 wherein the substrate is a semiconductive wafer, and further comprising:

after the selective removal of the $(\text{CH}_3)_y\text{Si}(\text{OH})_{4-y}$ of the unexposed portions, and while the $(\text{CH}_3)_x\text{SiO}_{2-x}$ of the exposed portions remains over the substrate, cutting the wafer into separated die.

Sub B2

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25. A semiconductor processing method, comprising:

forming a layer of $\text{Si}(\text{OH})_4$ over a substrate;

exposing some portions of the layer to energy while leaving other portions unexposed, the exposing converting the exposed portions to SiO_2 ; and

after the exposing, subjecting the exposed and unexposed portions of the layer to hydrofluoric acid to selectively remove the $\text{Si}(\text{OH})_4$ of the unexposed portions relative to the SiO_2 of the exposed portions.

26. ~~26.~~ The method of claim ~~25~~²⁷ wherein the energy is in the form of ultraviolet light.

27. ~~27.~~ The method of claim ~~25~~²⁷ wherein the energy is in the form of ultraviolet light and is passed onto the layer of $\text{Si}(\text{OH})_4$ through openings in a patterned mask.

30. ~~28.~~ The method of claim ~~25~~²⁷ wherein the energy is in the form of an electron beam.

after the selective removal of the $\text{Si}(\text{OH})_4$ of the unexposed portions, and while the SiO_2 of the exposed portions remains over the substrate, cutting the wafer into separated die.

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